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EXAMINER	
MANDALA, VICTOR A	
ART UNIT	PAPER NUMBER
2826	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/612,764	LEBONHEUR ET AL.	
	Examiner	Art Unit	
	Victor A. Mandala Jr.	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,5,7,13-16,18-24 and 26-30* is/are pending in the application.

4a) Of the above claim(s) *6* is/are withdrawn from consideration.

5)☒ Claim(s) *20-24 and 26-30* is/are allowed.

6)☒ Claim(s) *1,4,5,7,13-16,18,and19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The Applicant argues against the rejection under U.S. Patent No. 6,537,482 Farnworth and the rejected U.S. Patent No. 6,531,026 Takeichi et al. The examiner has considered the arguments but finds them to be non-persuasive. The Applicant first argues that the previous rejection states the Farnworth fails to disclose a meniscus and states that the rejection submits that it would be inherent that the resin would form a meniscus. The Applicant continues to state that he or she disagrees with this characterization on page 16 lines 8-11 of the remarks section of the amendment. The Applicant does not go any further to explain the disagreement on why it would not be inherent. MPEP 2112 IV states, "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy,* 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) The rejection filed on 8/11/06 on page 2 lines 16-18 states, "it is inherent that the resin would form a meniscus on the side walls of the die due to the viscosity difference and the surface tension between the resin and the die". This explanation is with in the conditions as set in MPEP 2112 IV where the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. The MPEP 2112 V states, "Once a reference teaching product appearing to be substantially identical is made the basis of a rejection, and the examiner presents evidence or reasoning tending to show inherency, the burden shifts to the applicant to show an unobvious difference. The PTO can require an applicant to prove that the prior art products do

not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on 'inherency' under 35 U.S.C. 102, on '*prima facie* obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald,*619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best,* 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977))".

2. The Applicant also argues that the newly added limitations of the meniscus being an imposed or capillary meniscus is not disclosed and inherent in Farnworth and Takeichi et al. The examiner has considered these arguments but finds them to be non-persuasive because in the Applicant's specification on page 15 lines 19-21 and 26-27 the Applicant defines imposed and capillary meniscus to be a result of different methods of making the resin layer, but the specification does not provide any further detail on what the actual resulting structure of the meniscus would be such as shape, radius, or size. The Applicant has not proved any structural differences between Farnworth's and Takeichi et al.s' meniscus and the Applicant's; hence it would be inherent that Farnworth's and Takeichi et al. teaches the same meniscus as the Applicant.

3. The Applicant also argues that compound cap is not made from a mold. The examiner has considered these arguments but finds them to be non-persuasive in regard to claims 1, 10, and 14 because these claims are drawn to the structure of the device and where the limitation of molding is drawn to the process of making the device. The specification and the claims do not define a structure of the compound cap that would result in something materially different then Farnworth's and Takeichi et al.s' compound cap. Also note that a "product by process" claim is

directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); In re Fitzgerald, 205 USPQ 594, 596 (CCPA); In re Marosi et al., 218 USPQ 289 (CAFC); and most recently, In re Thorpe et al., 227 USPQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that Applicant has burden of proof in such cases as the above case law makes clear.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,537,482 Farnworth.

4. Referring to claim 1, an article comprising: a first die disposed upon a mounting substrate, (Figure 14 #10), wherein the first die, (Figure 14 #20), includes a first die, (Figure 14 #20), active first surface and a first die backside second surface; and a molding compound cap, (Figure 14 #56), abutting the first die, (Figure 14 #20), and including a third surface that originates substantially above the first die, (Figure 14 #20), active first surface and below the first die backside second surface, wherein the third surface that originates substantially above the

first die, (Figure 14 #20), active first surface includes: a meniscus, (Figure 14 #56 it is inherent that the resin would form a meniscus on the side walls of the die due to the viscosity difference and the surface tension between the resin and the die and also see #1 in arguments above), that originates substantially above the first die, (Figure 14 #20), active first surface, wherein the meniscus is an imposed or a capillary action meniscus, (see #2 in arguments above); and a substantially planar surface that is selected from parallel planar to the first die, (Figure 14 #20), active first surface, and located above the first die, (Figure 14 #20), active first surface at a height that is a fraction of the die height.

5. Referring to claim 4, an article, wherein the third surface that originates substantially above the first die, (Figure 14 #20), active first surface includes: a meniscus, (Figure 14 #56 it is inherent that the resin would form a meniscus on the side walls of the die due to the viscosity difference and the surface tension between the resin and the die), that originates substantially above the first die, (Figure 14 #20), active first surface; and a substantially planar surface, (Figure 14 #56), that is coplanar to the first die, (Figure 14 #20), active first surface.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5, 7-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,537,482 Farnworth in view of U.S. Patent No. 6,727,583 Naka et al.

6. Referring to claim 5, an article, further including a second die disposed upon the mounting substrate, (Farnworth Figure 14 #10), wherein the second die, (Naka et al. Figure 18 #1), includes a second die, (Naka et al. Figure 18 #1), active first surface and a second die, (Naka et al. Figure 18 #1), backside second surface, and wherein the molding compound cap, (Naka et al. Figure 18 #2), abuts the second die, (See ** below).

** Farnworth et al. discloses the claimed invention except for a second or third die, but Naka et al. does. It would have been obvious to one having skill in the art at the time the invention was made to make multiple dies, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. vs. Bomis Co. 193USPQ8

7. Referring to claim 7, an article, further including a second die, (Naka et al. Figure 18 #1), disposed upon the mounting substrate, (Naka et al. Figure 18 #4), wherein the second die, (Naka et al. Figure 18 #1), includes a second die, (Naka et al. Figure 18 #1), active first surface and a second die backside second surface, wherein the molding compound cap, (Naka et al. Figure 18 #2), abuts the second die, and wherein the molding compound includes a curvilinear profile between the first die, (Farnworth Figure 14 #20), and the second die, (Naka et al. Figure 18 #1), (See ** above).

8. Referring to claim 8, an article, further including: a second die, (Naka et al. Figure 18 #1), disposed upon the mounting substrate, (Naka et al. Figure 18 #4), wherein the second die includes a second die, (Naka et al. Figure 18 #1), active first surface and a second die, (Naka et al. Figure 18 #1), backside second surface, wherein the molding compound cap, (Naka et al. Figure 18 #2), abuts the second die; and a last die disposed upon the mounting substrate, (Naka

et al. Figure 18 #4), wherein the last die, (Naka et al. Figure 18 #1), includes a last die active, (Naka et al. Figure 18 #1), first surface and a last die, (Naka et al. Figure 18 #1), backside second surface, wherein the molding compound, (Naka et al. Figure 18 #4), cap abuts the last die, (See ** above).

9. Referring to claim 9, an article, further including: a second die, (Naka et al. Figure 18 #1), disposed upon the mounting substrate, (Naka et al. Figure 18 #4), wherein the second die, (Naka et al. Figure 18 #1), includes a second die, (Naka et al. Figure 18 #1), active first surface and a second die backside second surface, wherein the molding compound cap, (Naka et al. Figure 18 #2), abuts the second die; a last die disposed upon the mounting substrate, (Naka et al. Figure 18 #1), wherein the last die, (Naka et al. Figure 18 #1), includes a last die active first surface and a last die backside second surface, wherein the molding compound, (Naka et al. Figure 18 #2), cap abuts the last die; and wherein the first die, (Yamamoto et al. Figure 4D #103), the second die, (Naka et al. Figure 18 #1), and the last die, (Naka et al. Figure 18 #1), are arranged in a configuration selected from: the first die, (Farnworth Figure 14 #20), the second die, (Naka et al. Figure 18 #2), and the last die, (Naka et al. Figure 18 #1), are disposed in a single molding compound cap, (Naka et al. Figure 18 #2), structure; the first die, the second die, (Naka et al. Figure 18 #1), and the last die, (Naka et al. Figure 18 #1), are each disposed in separate molding compound cap structures; the first die and the second die, (Naka et al. Figure 18 #1), are disposed in a single molding compound cap structure, and at least two occurrences of the last die are disposed in a single molding compound, (Naka et al. Figure 18 #2), cap structure; and the first die and the second die, (Naka et al. Figure 18 #1), are each disposed in separate molding compound cap, (Naka et al. Figure 18 #2), structures, and at least two occurrences of the

last die are disposed in a single molding compound cap, (Naka et al. Figure 18 #2), structure, (See ** above).

10. Referring to claim 10, a package comprising: a first die, (Farnworth Figure 14 #20), disposed upon a mounting substrate, (Farnworth Figure 14 #10), wherein the first die, (Farnworth Figure 14 #20), includes a first die, (Farnworth Figure 14 #20), active first surface and a first die backside second surface; a molding compound cap, (Farnworth Figure 14 #56), abutting the first die, (Farnworth Figure 14 #20), and including a third surface that originates substantially above the first die, (Farnworth Figure 14 #20), active first surface and below the first die, (Farnworth Figure 14 #20), backside second surface, and that is substantially parallel planar to the first die backside second surface; wherein the third surface that originates substantially above the first die active first surface, includes: a meniscus that originates substantially above the first die active first surface, wherein the meniscus is an imposed meniscus or a capillary action meniscus, (Franworth Figure 14 #56 it is inherent that the resin would form a meniscus on the side walls of the die due to the viscosity difference and the surface tension between the resin and the die and also see #1 & 2 in arguments above); and a substantially planar surface that is parallel planar to the first die active first surface, and located above the first die active first surface at a height that is a fraction of the die height, (Figure 14 #56 it is inherent that the resin would form a meniscus on the side walls of the die due to the viscosity difference and the surface tension between the resin and the die and also see #1 & 2 in arguments above); and a heat spreader, (Naka et al. Figure 18 #6), bonded to the first die backside second surface, (See *** below).

*** Farnworth is silent on having a heat spreader and heat sink added to the chip design, but Naka et al. does teach it. It would have been obvious to one having skill in the art at the time the invention was made to combine the teachings of Naka et al. with the teachings of Farnworth because the addition of a heat spreader and sink allows for the chip to operate at cooler temperatures resulting in better performance and reliability.

11. Referring to claim 11, a package, further including: a heat sink, (Naka et al. Figure 18 #7), in thermal contact with the heat spreader, (Naka et al. Figure 18 #6) and See *** above).

12. Referring to claim 13, a package, further including: a second die, (Naka et al. Figure 18 #1), disposed upon the mounting substrate, (Farnworth Figure 14 #10 and Naka et al. Figure 18 #4), wherein the second die, (Naka et al. Figure 18 #1), includes a second die active first surface and a second die, (Naka et al. Figure 18 #1), backside second surface, wherein the molding compound cap, (Farnworth Figure 14 #56 and Naka et al. Figure 18 #2), abuts the second die, (Naka et al. Figure 18 #1); and a last die, (Naka et al. Figure 18 #1), disposed upon the mounting substrate, (Farnworth Figure 14 #10 and Naka et al. Figure 18 #4), wherein the last die, (Naka et al. Figure 18 #1), includes a last die, (Naka et al. Figure 18 #1), active first surface and a last die, (Naka et al. Figure 18 #1), backside second surface, wherein the molding compound cap, (Farnworth Figure 14 #56 and Naka et al. Figure 18 #2), abuts the last die, (See ** above).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. U.S. Patent No. 6,537,482 Farnworth in view of U.S. Patent No. 6,434,017 Iwabuchi.

13. Referring to claim 14, a computing system comprising: a first die disposed upon a mounting substrate, (Farnworth Figure 14 #10), wherein the first die, (Farnworth Figure 14 #20), includes a first die active first surface and a first die, (Farnworth Figure 14 #20), backside second surface; and a molding compound cap, (Farnworth Figure 14 #56), abutting the first die and including a third surface that originates substantially above the first die, (Farnworth Figure 14 #20), active first surface and below the first die, (Farnworth Figure 14 #20), backside second surface; wherein the third surface that originates substantially above the first die active first surface includes: a meniscus that originates substantially above the first die active first surface, wherein the meniscus is an imposed meniscus or a capillary action meniscus, (Franworth Figure 14 #56 it is inherent that the resin would form a meniscus on the side walls of the die due to the viscosity difference and the surface tension between the resin and the die and also see #1 & 2 in arguments above); and a substantially planar surface that is parallel planar to the first die active first surface, and parallel planar located above the first die active first surface at a height that is a fraction of the die height, (Franworth Figure 14 #56 it is inherent that the resin would form a meniscus on the side walls of the die due to the viscosity difference and the surface tension

between the resin and the die and also see #1 & 2 in arguments above); and dynamic random-access data storage coupled, (Iwabuchi Col. 1 and Figure 4), to the first die, (Farnworth Figure 14 #20).

/ Farnworth teaches all of the claimed matter, but is silent on the functionality of the device having a function in a DRAM device, but does teach a function for a semiconductor device, which is a broad term which would include a DRAM, since a DRAM is a semiconductor device. It would be obvious to one having skill in the art to combine the teachings of Farnworth with the teachings of Iwabuchi because the function of the device as based in the claims do not change the structure of the device consistent with the molding resin as claimed. In reference to the claim language referring to [the function of the device being connected to a DRAM], intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963).

14. Referring to claim 15, a computing system, wherein the computing system is disposed in one of a computer, a wireless communicator, a hand-held device, an automobile, a locomotive, an aircraft, a watercraft, and a spacecraft, (Iwabuchi Col. 1 and Figure 4 and see */* above).

15. Referring to claim 16, a computing system according to claim 14, wherein the microelectronic die is selected from a data storage device, a digital signal processor, a micro

controller, an application specific integrated circuit, and a microprocessor, (Iwabuchi Col. 1 and Figure 4 and see */* above).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No U.S. Patent No. 6,537,482 Farnworth in view of U.S. Patent No. 6,434,017 Iwabuchi in further view of U.S. Patent No. 6,727,583 Naka et al.

16. Referring to claim 18, a computing system, further including a second die disposed upon the mounting substrate, (Farnworth Figure 14 #10 and Naka et al. Figure 18 #4), wherein the second die, (Naka et al. Figure 18 #1), includes a second die, (Naka et al. Figure 18 #1), active first surface and a second die, (Naka et al. Figure 18 #1), backside second surface, wherein the molding compound cap, (Farnworth Figure 14 #56 and Naka et al. Figure 18 #2), abuts the second die, (Naka et al. Figure 18 #1); and a last die, (Naka et al. Figure 18 #1), disposed upon the mounting substrate, wherein the last die, (Naka et al. Figure 18 #1), includes a last die active first surface and a last die, (Naka et al. Figure 18 #1), backside second surface, wherein the molding compound cap, (Naka et al. Figure 18 #2), abuts the last die, (Naka et al. Figure 18 #1) and See *//* on the next page).

// Farnworth and Iwabuchi discloses the claimed invention except for a second or third die, but Naka et al. does. It would have been obvious to one having skill in the art at the time the invention was made to make multiple dies, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. vs. Bomis Co. 193USPQ8

17. Referring to claim 19, a computing system, further including a second die, (Naka et al. Figure 18 #1), disposed upon the mounting substrate, (Farnworth Figure 14 #10 and Naka et al. Figure 18 #4), wherein the second die, (Naka et al. Figure 18 #1), includes a second die, (Naka et al. Figure 18 #1), active first surface and a second die, (Naka et al. Figure 18 #1), backside second surface, wherein the molding compound cap, (Farnworth Figure 14 #56 and Naka et al. Figure 18 #2), abuts the second die, (Naka et al. Figure 18 #1); and a last die disposed upon the mounting substrate, (Naka et al. Figure 18 #4), wherein the last die, (Naka et al. Figure 18 #1), includes a last die , (Naka et al. Figure 18 #1), active first surface and a last die, (Naka et al. Figure 18 #1), backside second surface, wherein the molding compound cap, (Naka et al. Figure 18 #2), abuts the last die, (Naka et al. Figure 18 #1) and See *//* above).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 10, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,531,026 Takeichi et al. in view of U.S. Patent No. U.S. Patent No. 6,727,583 Naka et al.

18. Referring to claim 10, Takeichi et al. teaches a package comprising: a first die, (Takeichi et al. Figure 1D #3), disposed upon a mounting substrate, (Takeichi et al. Figure 1D #1), wherein the first die, (Takeichi et al. Figure 1D #3), includes a first die active first surface and a first die backside second surface; a molding compound cap, (Takeichi et al. Figure 1D #4), abutting the first die, (Takeichi et al. Figure 1D #3), and including a third surface that originates substantially above the first die, (Takeichi et al. Figure 1D #3), active first surface and below the first die, (Takeichi et al. Figure 1D #3), backside second surface, and that is substantially parallel planar to the first die, (Takeichi et al. Figure 1D #3), backside second surface wherein the third surface that originates substantially above the first die active first surface, includes: a meniscus that originates substantially above the first die active first surface, wherein the meniscus is an imposed meniscus or a capillary action meniscus, (Takeichi et al. Figure 1D #4 it is inherent that the resin would form a meniscus on the side walls of the die due to the viscosity difference and the surface tension between the resin and the die and also see #1 & 2 in arguments above); and a substantially planar surface that is parallel planar to the first die active first surface, and located

above the first die active first surface at a height that is a fraction of the die height, (Franworth Figure 14 #56 it is inherent that the resin would form a meniscus on the side walls of the die due to the viscosity difference and the surface tension between the resin and the die and also see #1 & 2 in arguments above); and a heat spreader, (Takeichi et al. does not teach a heat spreader, but Naka et al. Figure 18 #6 does and See * below), bonded to the first die, (Takeichi et al. Figure 1D #3), backside second surface.

* Takeichi et al. is silent on having a heat spreader and heat sink added to the chip design, but Naka et al. does teach it. It would have been obvious to one having skill in the art at the time the invention was made to combine the teachings of Takeichi et al. with the teachings of Naka et al. because the addition of a heat spreader and sink allows for the chip to operate at cooler temperatures resulting in better performance and reliability.

19. Referring to claim 11, Takeichi et al. teaches a package according to claim 10, further including: a heat sink in thermal contact with the heat spreader, (See * above).

20. Referring to claim 13, Takeichi et al. teaches a package according to claim 10, further including: a second die disposed upon the mounting substrate, (Takeichi et al. Figure 1D #1), wherein the second die, (Takeichi et al. Figure 1D #3 silent about having a second die, but See ** below), includes a second die, (Takeichi et al. Figure 1D #3 and See ** below), active first surface and a second die, (Takeichi et al. Figure 1D #3 and See ** below), backside second surface, wherein the molding compound cap, (Takeichi et al. Figure 1D #4), abuts the second die; and a last die disposed upon the mounting substrate, (Takeichi et al. Figure 1D #1), wherein the last die includes a last die, (Takeichi et al. Figure 1D #3 and See ** below), active first surface and a last die, (Takeichi et al. Figure 1D #3 and See ** below), backside second surface,

wherein the molding compound cap, (Takeichi et al. Figure 1D #4), abuts the last die, (Takeichi et al. Figure 1D #3 and See ** below).

** Takeichi et al. discloses the claimed invention except for a second die. It would have been obvious to one having skill in the art at the time the invention was made to make the device with an additional die, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. vs. Bomis Co. 193USPQ8

Allowable Subject Matter

21. The following is an examiner's statement of reasons for allowance:

The prior art teaches a die disposed upon a mounting substrate and where an under fill is formed from a mold process. The prior art does not teach the above teachings with the under fill being formed from the mold to have a profile that results in the under fill to originate on a die at a die height that is substantially above the die active surface and below the die backside second surface, and that forms a third surface that is substantially parallel planar to the die backside second surface. This combination has been found to be non-obvious thus allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

22. Claims 20-24 and 26-30 are allowed.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor A. Mandala Jr. whose telephone number is (571) 272-1918. The examiner can normally be reached on Monday through Thursday from 8am till 6pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

VAMJ
3/27/07

EVAN PERT
PRIMARY EXAMINER